

Serial No. 10/591,463
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Amendments to the Claims:

The following listing of claims replaces all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A fuel reformer arranged in a fuel supply system leading from a fuel supply source to a combustion apparatus, said fuel reformer ~~[[and]]~~ comprising:

a casing provided with an inlet communicating with said fuel supply source, an outlet communicating with said combustion apparatus, said casing including ~~[[and]]~~ a process chamber communicating with said inlet and outlet, ~~[[and]]~~

a granular catalytic material filled in said process chamber, ~~of said casing, wherein~~

said granular material including a core having a layer of metal oxide formed on the surface of said core, said layer having a structure in which a bonding quantity of bond with oxygen ~~[[is]]~~ gradually decreases with increasing depth from an upper surface of said layer ~~decreased as goes from the surface to the inside and photocatalytic property responding to an electromagnetic wave with wavelength longer than that of the ultraviolet ray is formed on the surface of said catalytic material, said layer of metal oxide providing photocatalytic property which activates the fuel to be reformed,~~

said catalytic material is filled in said process chamber at a space rate of 50% or less as defined in the following equation:

space rate (%) = ((capacity inside the process chamber - total volume of the catalytic material) / capacity inside the process chamber) x 100, and

said combustion apparatus is an engine and said catalytic material is filled in said process chamber so that the total of the surface area of the catalytic material filled in said process chamber is 5,000 cm² or more per displacement of 1,000cc of the engine.

2.-4. (Canceled)

5. (Currently amended) A fuel reformer according to ~~any one of claims 1 to 4~~ claim 1, wherein ~~[[the]]~~ a particle diameter of said catalytic material is 20mm or less.

6. (Currently amended) A fuel reformer according to ~~any one of claims 1 to 5~~ claim 1, wherein said catalytic material has a hollow structure.

7. (Currently amended) A fuel reformer according to ~~any one of claims 1 to 6~~ claim 1, wherein said core ~~eatalytic material~~ has an open piercing hole lined with said layer ~~piereing the eatalytic material~~.

8. (Currently amended) A fuel reformer according to ~~any one of claims 1 to 7~~ claim 1, wherein said casing is provided with a cylindrically formed body portion and lid bodies covering each of

both end openings of ~~[[the]]~~ said body portion, and at least one of said lid ~~[[body]]~~ bodies is removably attached to ~~at least one of~~ said ~~the both~~ end openings of said body portion.

9. (Currently amended) A fuel reformer according to ~~any one of~~ ~~claims 1 to 8~~ claim 1, wherein at least end of said process chamber is defined by a mesh-state material.

10. (New) A fuel reformer arranged in a fuel supply system leading from a fuel supply source to a combustion apparatus, said fuel reformer comprising:

a casing provided with an inlet communicating with said fuel supply source, an outlet communicating with said combustion apparatus, said casing including a process chamber communicating with said inlet and outlet,

a granular catalytic material filled in said process chamber, said granular material including a core having a layer of metal oxide formed on the surface of said core, said layer having a structure in which a bonding quantity of oxygen gradually decreases with increasing depth from an upper surface of said layer, said layer of metal oxide providing photocatalytic property which activates the fuel to be reformed,

said catalytic material is filled in said process chamber at a space rate of 50% or less as defined in the following equation:

space rate (%) = ((capacity inside the process chamber - total volume of the catalytic material) / capacity inside the process chamber) × 100, and

said catalytic material is filled in said process chamber so that the total of the surface area of the catalytic material filled in said process chamber is 5,000 cm² or more per flow rate 0.1 L/min of the fuel passing through said process chamber.

11. (New) A fuel reformer according to claim 10, wherein the particle diameter of said catalytic material is 20mm or less.

12. (New) A fuel reformer according to claim 10, wherein said catalytic material has a hollow structure.

13. (New) A fuel reformer according to claim 10, wherein said core has an open piercing hole lined with said layer.

14. (New) A fuel reformer according to claim 10, wherein said casing is provided with a cylindrically formed body portion and lid bodies covering end openings of said body portion, and at least one said lid bodies is removably attached to one of said end openings of said body portion.

15. (New) A fuel reformer according to claim 10, wherein at least one end of said process chamber is defined by a mesh-state material.

16. (New) A fuel reformer, comprising:

a casing provided with an inlet for communicating with a fuel supply source, an outlet for communicating with a combustion apparatus, said casing including a process chamber communicating with said inlet and outlet,

a granular catalytic material filled in said process chamber,

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said granular material including a core having a layer of metal oxide formed on the surface of said core, said layer having a structure in which a bonding quantity of oxygen gradually decreases with increasing depth from an upper surface of said layer, said layer of metal oxide providing photocatalytic property which activates the fuel to be reformed, and

said core including an open piercing hole lined with said layer.